Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

ON THE IMPORTANCE, TO THE ARCHÆOLOGIST AND ETHNOLOGIST, OF

AN ACCURATE MODE OF MEASURING HUMAN CRANIA,

AND OF RECORDING THE RESULTS;—WITH THE DESCRIPTION OF

A NEW CRANIOMETER.

By JOHN GRATTAN,

Member of Council of the Natural History and Philosophical Society, Belfast.

Probably in no department of research is the admitted dependence of one branch of knowledge upon another more sensibly apparent than in the study of Ethnology, or that science which attempts to investigate the progressional history of the various races of mankind.

To decypher the faint and fading records of antiquity, and penetrate the mystery that enshrouds the earlier conditions of our race, in order to inform ourselves, so far as such can now be done, of the social and mental status of those our predecessors who constructed the works of art, or transmitted to us the intellectual revelations of themselves, which have reached our day,—and to define the epochs and distinguish the races to which the several results are to be assigned,—is a work requiring the labour and co-operation of many hands.

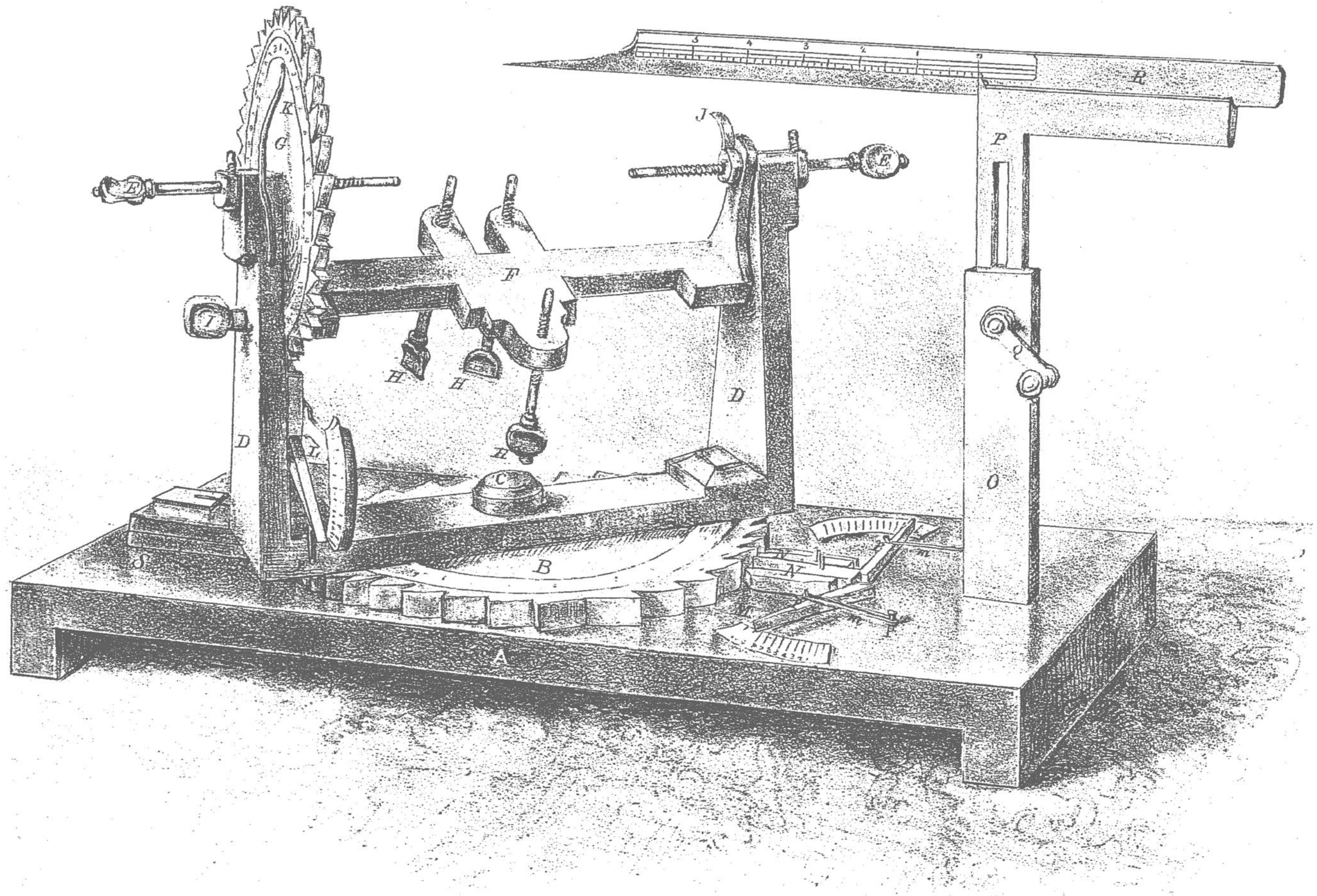
By what means, for example, are we to ascertain whether the (so-called) Stone, Bronze, and Iron eras of these countries are to be attributed to a slow development of one race continued through a series of ages, or are due to successive impulses derived from new occupants of the soil; who, themselves "forgetting their cunning" and lapsing into unimprovable supineness, came, in their turn, to be supplanted by others of fresher energies and higher capabilities? The Archæologist may pursue the history of an implement or a weapon until he fancies he has detected its prototype in the product of some distant land, where knowledge and the arts of life had made early progress;—or the Philologist trace to their apparent source such lingering relics of language as may have chanced to outlive the mutations of time and the obliterating influences of civilization;—but, however strong the probabilities thus arrived at may appear, they are still no more than probabilities: for it may be possible that such coincident results are, after all, but exponents of the instinctive efforts of our common nature to provide for the necessities which are the heritage of every race: just as at the present day, in New Zealand, the Society Islands, and other countries where civilization has made but partial progress, we find stone hatchets, flint arrow-heads, and bone implements, identical in design and execution with those of the remote ages of our own country.

How then,—it may not unreasonably be asked,—are we to arrive at anything like conclusive knowledge upon such subjects? Clearly, in no other way than by adding, to the probabilities thus established, the further corroboration of *identity of race* between the individuals cotemporaneous with their respective works of art.

That numerous migrations of the human family have taken place at various periods, both tradition and history aver; and that changes alike vast and durable have resulted therefrom, will scarcely admit of question. But, while history, within the limits of her domain, testifies to the facts and records the results,—thereby affording a reasonable presumption that the assertions of tradition cannot be wholly without foundation in truth,—we are, nevertheless, far from being in a position to assign to each race its true influence, or to award to it its proper share in the general scheme of social progress; inasmuch as we are yet without adequate scientifically recorded data by which to determine the distinctive physical characteristics even of those races that have performed the most prominent parts in the progress of the world.

That such should be the case with regard to those separated from us by long intervals of time, is scarcely to be wondered at; but it is little creditable, either to our industry or research, to be compelled to admit that, not even as we approach comparatively nearer to our own day, is this deficiency less apparent. We know, beyond the reach of question, that Picts, Celts, Romans, Saxons, Danes and Normans, either originally occupied these countries, or successively invaded and colonized them; yet where are our proofs that they differed in physical conformation from each other; or how, and in what particulars? Their language, their weapons, their works of art, their wars, religious ceremonies, and superstitions, have either left behind them tangible representatives to reward the labours of the archæologist, or been recorded with sufficient minuteness to furnish materials for the historian; whilst of the men themselves—those actors in scenes, and originators of movements, which have been so largely instrumental in the erection of our present social structure—we are, (*scientifically speaking,*) absolutely without reliable information. Nay, we are not, even at this moment, in possession of properly digested materials for establishing, upon a scientific basis, the specific differences between the two great races, the *Celtic* and the *Saxon,* known to be so largely intermingled in these islands.

If such be the case concerning these, who possess the advantage of historic recognition, what reasonable probability,—it may fairly be inquired,—can there be of our attaining to any knowledge of those who are beyond the ken of history, and of whom even tradition herself is mute. Fortunately, the physical conformation and mental aptitudes of the races that have occupied any country, are prominently represented by the *osseous remains* of the individuals themselves; and these, though exextremely perishable, and less abundant than could be desired, are still, to a considerable extent accessible. The spade and the ploughshare, the cuttings of the engineer, and the excavations of the architect, are daily bringing them to light; and though, through ignorance of their value, much may have been irretrievably lost, much also has fallen into safe keeping, and been preserved with religious care



CRANIOMETER.

M. Ward & Co. lith, Belfast.

REFERENCES TO CRANIOMETER.

A.	Horizontal Platform.
B.	do. Disk.
C.	Pin round which horizontal disk revolves.
DD.	Uprights attached to horizontal disk.
EE.	Screws passing through the uprights, and round which Stage and Cranium revolve.
F.	Revolving Stage.
G.	Vertical disk.
HHH.	Screws for adjusting Cranium.
I.	Pin for securing Stage in its Zero position.
J.	Pinching Screw for securing it in any other position.
K.	Index for reading off divisions of vertical disk.
L.	Index and Scale for reading off single degrees on the vertical disk.
M.	,, ,, ,, on horizontal do.
N.	Sliding ratchets which put Indexes in motion.
O.	Upright carrying Scale.
P.	Slide for elevating do.
Q.	Screw and handle for securing do. in position.
R.	Sliding Scale, divided into inches and 10ths.
S.	Slide for locking horizontal disk, when necessary.
mmm.	Elastic India-rubber rings for moving the Indexes and ratchets.
ppp.	Pins for securing the Elastic rings to the Platform and Indexes.

"Hitherto," however,—as has been remarked with equal force and beauty by the projectors of a contemplated work upon the Crania of the British Islands,*—"hitherto, no publication has been devoted to the chief vestige of the organization of the primitive Briton and his successors,—that most important and instructive of all—his Cranium. In the skulls themselves, we have the very "heart of hearts" of all their remains, which the gnawing "tooth of time and razure of oblivion" have spared. These present an exact measure of their differing cerebral organization, of their intellect, and feelings; and may be said to be impressed with a vivid outline of their very features and expressions. It is believed that a sufficient number of these precious relics have now been exhumed from Barrows and other tombs, in which the living hands of their brethren (observing the dictates of eternal love or the rites of an all-pervading superstition, based in inextinguishable aspirations,) deposited them, to enable us not merely to reproduce the most lively and forcible traits of the primæval Celtic hunter or warrior, and his Roman conqueror, succeeded by Saxon or Angle chieftains and settlers, and, later still, by the Vi-kings of Scandinavia; but also to indicate the peculiarities which marked the different tribes and races who have peopled the diversified regions of the British Islands: and, as we thus picture our varied ancestry, to deduce, at the same time, their position in the scale of civiliation by the tests of accurate representation and *admeasurement*. These primitive remains are of great interest,—of real national value,—and deserve the most careful examination and study, that they may be delineated with the utmost precision,—with artistic skill worthy of the subject; and, being thus perpetuated, they will be rescued from the grasp of accidental destruction, and the further inroads of fretting age."

Entirely concurring in these views, and recognizing to the fullest extent the value of pictorial representations, still, as they alone do not fulfil the exact requirements of science, and as we are as yet without any authentic standard of reference, or accredited system of measurement, it appears to me that we shall not be in a position to do justice to our materials, or to render them as available and instructive as they are intrinsically capable of becoming, till we adopt some method of measuring cranial forms and magnitudes, which, by possessing the calm authority of mathematical precision, shall command universal acceptance, and concentrate, upon a uniform plan, the detached efforts of all inquirers.

For many years past my friend Mr. Getty and myself have had in our possession some exceedingly interesting and valuable specimens of Irish Crania, obtained from Round Towers and other authentic sources, several of which have already been exquisitively drawn on stone by our talented fellow-townsman, Mr. Burgess. Up to the present time, however, we have been deterred from proceeding further from inability to furnish *measurements* of them sufficiently accurate, either to satisfy our own minds, or to permit of their being conveyed with precision to the minds of others.

My attention having been thus, in a manner, compelled to the subject, I have at length succeeded in devising an Instrument which, I am sanguine enough to hope, will enable us to meet most of the essential requirements of the case, and supply us with the means of taking and recording measurements of Crania, in a manner combining perfect simplicity and facility of application with rigid scientific accuracy; so that, should the originals themselves ever chance to be destroyed, we could, without difficulty or hesitation, reproduce fac-similes of them, minutely correct in all essential particulars, by means of the measurements thus recorded.

---

* Crania Britannica, or Delineations of the Skulls of the aboriginal Inhabitants of the British Islands, and of the races immediately succeeding them. By Joseph B. Davis, and John Thurnham. London, Taylor & Francis. To be printed for Subscribers only.

The importance to the Ethnologist of any method, which will thus enable him to avail himself of the recorded observations of others without risk of misapprehension, can scarcely be over-estimated; and, should my expectations on this point be justified by experience, I look forward to our accumulating, at no very distant period, a large amount of well-defined and unimpeachable data, to which all interested in such pursuits may refer with confidence; and to our eventually developing general laws respecting the cerebral conformation of the various races of mankind, which will contribute no unimportant quota to the history of their dispersion, and reflect new light, not merely upon the accessible present but, deep into the dark recesses of the shadowy past.

Having premised so much, I shall now proceed to describe the Instrument and the mode of employing it.

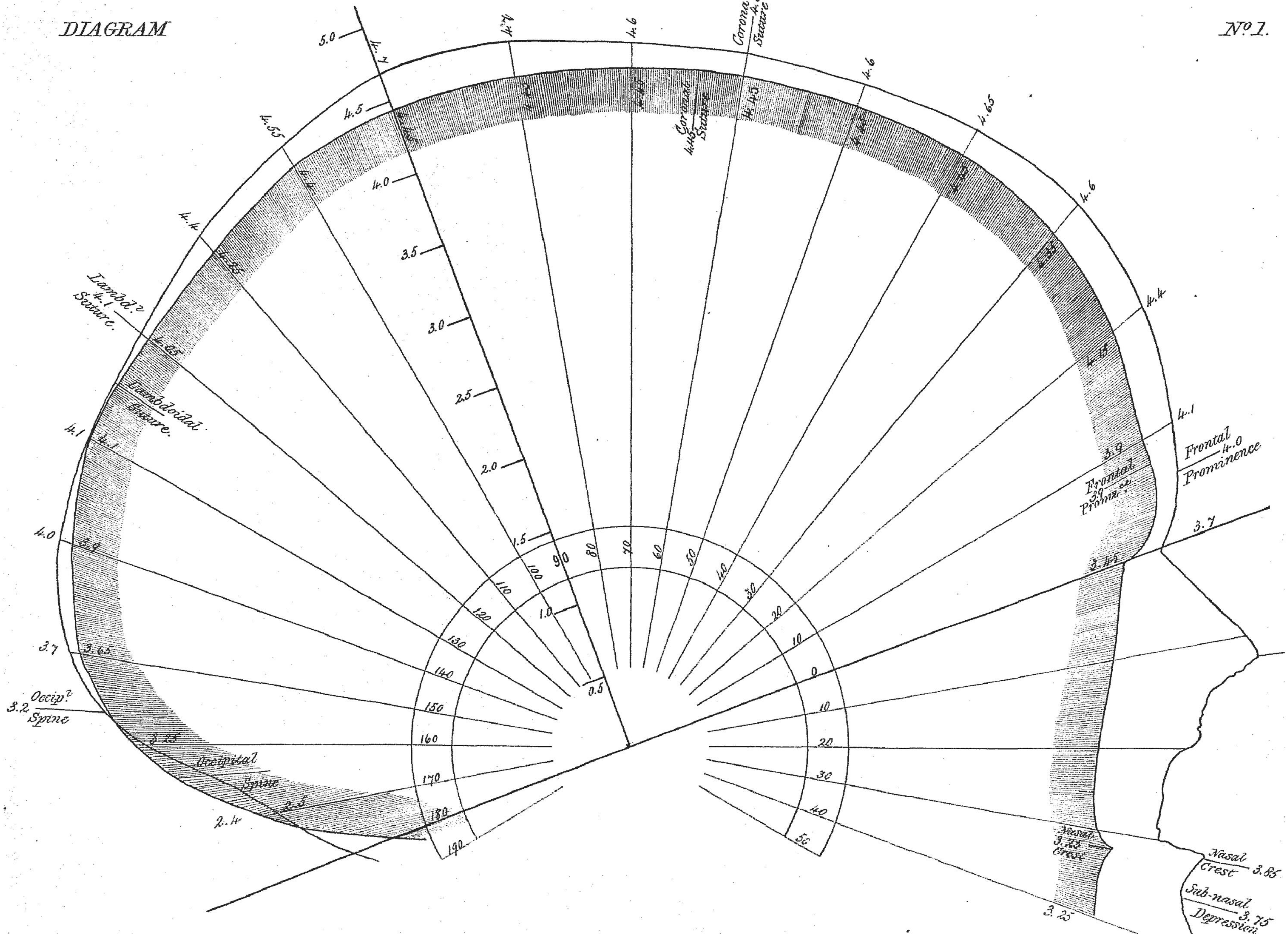
Upon a horizontal platform 16 inches by 8, the sides of which, for facilitating description, may be supposed to represent the cardinal points,—its long diameter corresponding to North and South,—a toothed circular disk 8 inches in diameter, having its periphery divided into degrees of which each tooth occupies 10, is made to revolve freely eastward or westward round a vertical axis.

Upon and across this disk, immoveably secured thereto, extends from east to west a bar of wood 9 inches by 2, which carries at either extremity an upright 7 inches long. Through these uprights, close to their upper extremities, pass two long screws which, if continued till they met, would exactly intersect the vertical axis round which the disk revolves. The ends of these screws are tipped with brass, shaped so as to permit of their insertion into the *external auditory foramina* of a skull, and allow of the ready rotation of the Cranium upon them. Thus two motions of rotation can be given to the Cranium, one *vertical* upon a horizontal axis passing through the auditory foramina—the other *horizontal* round a vertical axis bisecting the horizontal axis—the point of bisection constituting the *common centre* from which the majority of the measurements are calculated.

Instead of simply suspending the Cranium upon the screws described, a small stage is appended which revolves round them, carrying with it the Cranium and also a second toothed disk similar to the first but of rather smaller dimensions. Each disk has the degrees marked upon it eastward and westward from zero up to 180: the zero of the lower disk corresponding to the due north point of the platform; that of the upper to any determinate point upon the median line of the Cranium. A sliding ratchet locks the teeth of each disk; and, as it becomes depressed by the passage of each tooth, (the equivalent of 10 degrees,) it puts in motion a multiplying index which indicates single degrees, or even fractions of a degree, if desired.

DIAGRAM

No 1.

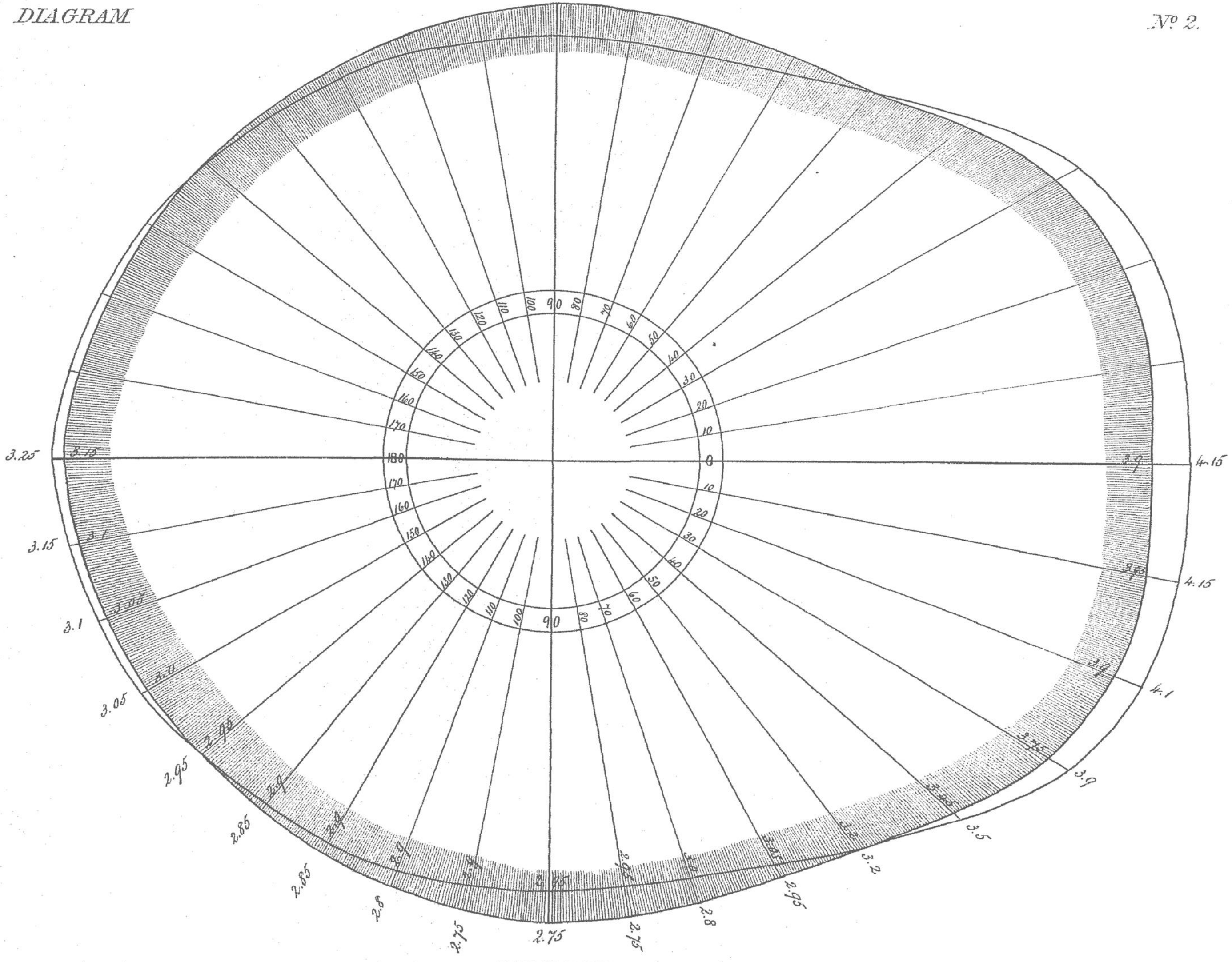


SKULL FROM LARNE.
Outline plain and figures external.

MEDIAN SECTIONS,
Projected from the Measurements.

SKULL OF DONATUS.
Outline shaded & figures upon the shading.

DIAGRAM *No. 2.*



SKULL FROM LARNE.
tline plain and figures external.

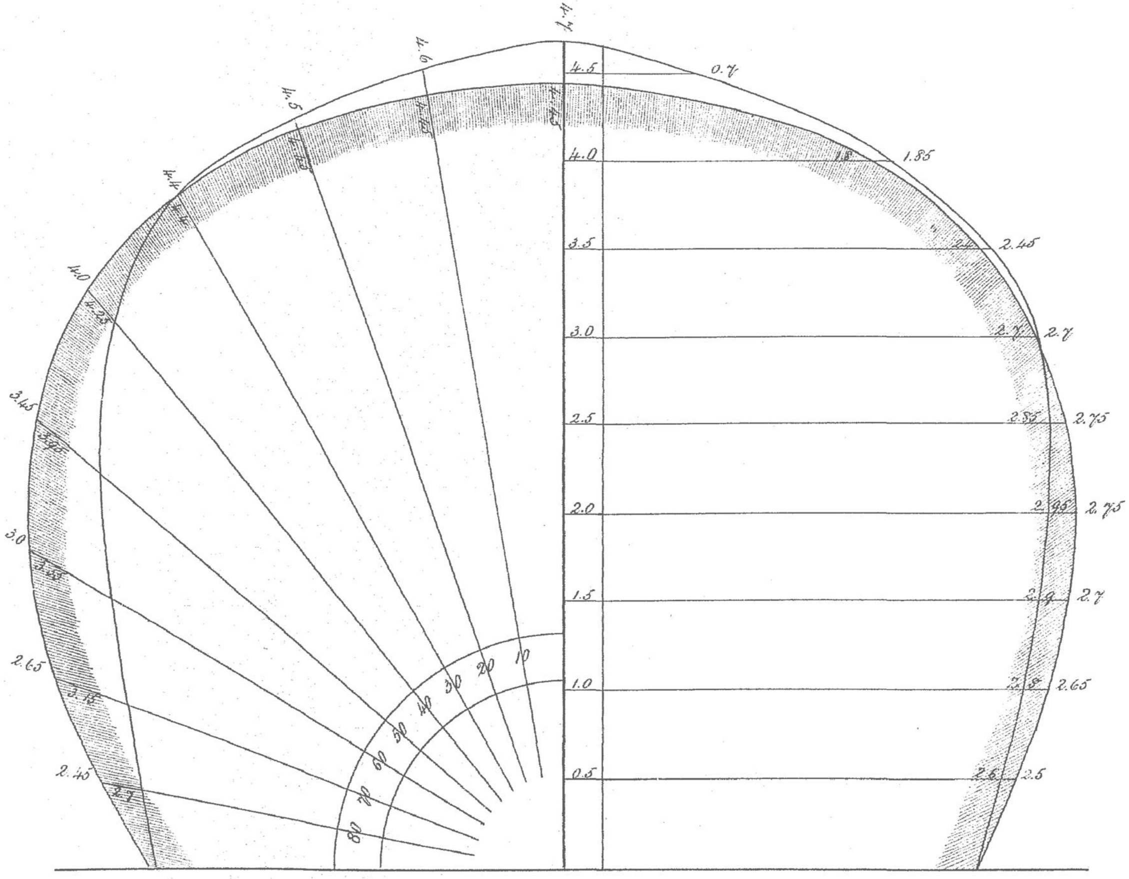
HORIZONTAL SECTIONS,
Projected from the Maximum horizontal measurements.

SKULL OF DONATUS.
Outline shaded & figures upon the sha

M. Ward & Co's Litho.
[illegible]

AGRAM

No. 3.

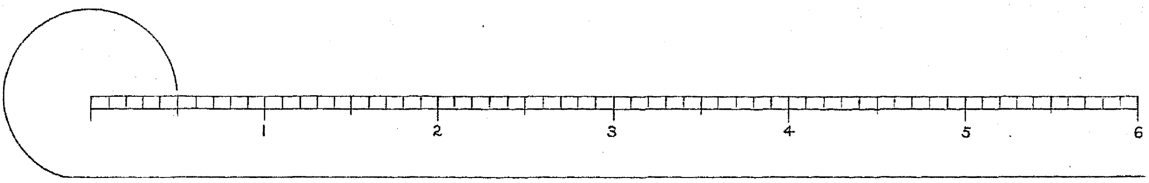


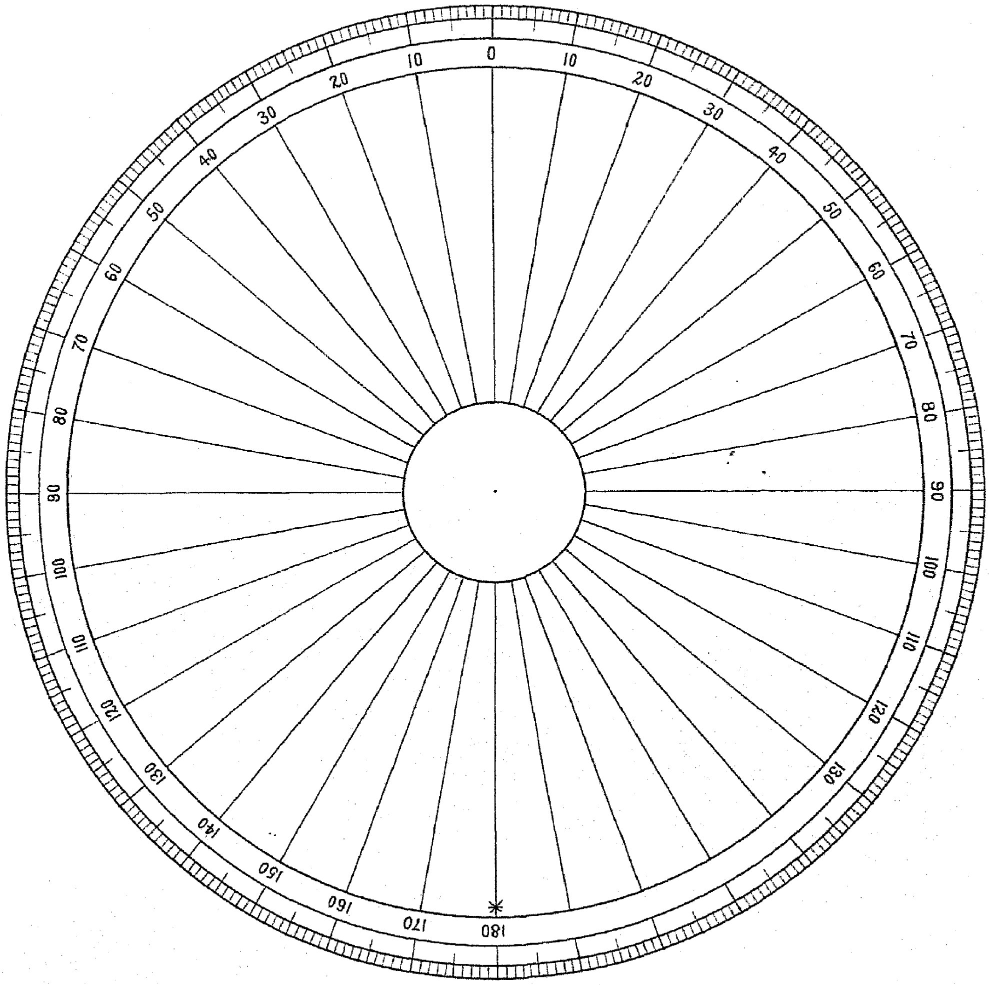
SKULL FROM LARNE.
Outline plain and figures external.

TRANSVERSE SECTIONS
at 90 degrees from Zero,—
The left halves from the transverse, & the right from the horizontal measurements.

SKULL OF DONATUS.
Outline shaded & figures upon the shad

M. Ward & Co. Lith.
Corn Market, Belfast





Upon the platform, 8 inches north from the centre of the lower disk, is fixed a perpendicular upright 6 inches high, which carries a scale divided into inches and tenths. This scale slides freely northward or southward in a horizontal plane. Its southern extremity terminates in a point, and is so adjusted that, when the index stands at 0, the point exactly coincides with the point of intersection of the axes of the two disks. This scale likewise admits of being elevated or depressed, without disturbance of its horizontal or meridional direction. There are some subsidiary contrivances for insuring facility and accuracy of manipulation which will be sufficiently intelligible by simple reference to the accompanying sketch.

In order to employ this Instrument, it is to be adjusted with the zero of the lower disk due north, and that of the upper in coincidence with an index attached to one of the uprights carrying the screws upon which the stage revolves:—both disks to be secured in these positions by contrivances for the purpose until the Cranium is adjusted.

A Cranium being now placed upon the stage with its median line north and south, the face looking northwards, it is to be secured by turning the screws until their brass extremities enter the auditory foramina. The zero point of the Cranium (the *naso-frontal suture* or point of junction between the nasal and frontal bones) must then be elevated or depressed until the point of the graduated scale, when pushed forward, shall exactly impinge upon that spot: the Cranium is then to be secured *in situ* by means of screws attached to the stage for that purpose.

If this stage be now made to revolve on its axis—the horizontal disk remaining stationary—the entire median line of the Cranium will be successively carried past the point of the scale, each tooth of the revolving disk moving it through 10 degrees; the scale at the same time indicating the exact distance, in inches and 10ths, between the point with which it is brought into contact and the axial centre. If now we bring any point of the median line we please,—say 50 degrees from zero,—to the point of the scale, and, fixing the stage in that position, set free the horizontal disk, it may be moved eastward or westward through an arc of 90 degrees, carrying the Cranium with it past the scale; which, as in the preceding case, will indicate the radial length of every point to which it may be applied: and thus the whole of the Cranium may be measured to any degree of minuteness, and the results recorded with mathematical precision. In a word, the *longitude* and *latitude*,—so to speak,—of every point, can be determined, and its radial extension measured.

In addition to these measurements, which may be distinguished by the terms *Median* and *Transverse Sections*, a series of horizontal measurements, having the vertical axis for their centre, may be taken at successive elevations of 0.5 inches, by securing the skull at zero, raising the graduated scale the required amount, and rotating the horizontal disk round its axis. These may be denominated *Horizontal Sections*.—For a few other measurements the callipers will still be indispensable.

EXAMPLES OF THE MEASUREMENTS.

In the accompanying Tables the measurements of two skulls, taken upon this plan, are attempted to be reduced to system: they are offered, however, merely as a first attempt, accurate as far as they go, but open to be modified or remodelled by more extensive experience.

The first Table contains measurements from the skull of Donatus or Dunan who, (according to D'Alton's "Archbishops of Dublin," page 26,) "was the first among the Ostmen who was Bishop of Dublin. By the aid of Sitric, the King, he built the Cathedral of the Holy Trinity, afterwards called Christ Church, in the heart of that city, about the year 1038 ; and on the 6th of May, 1074, died at an advanced age, and was buried in his own Cathedral, in the upper part of the chancel, upon the right hand side." Worsaae,† likewise refers to him, and also gives 1074 as the date of his decease. Several years since, during the progress of some repairs, the grave of this Donatus was discovered in the position indicated; the church having undergone very few alterations since it was first built : the only material one being the rebuilding of the south side of the nave, which fell down in the year 1562. Fragments of his mitre, adhering to the skull, still remained; portions of a pewter chalice and platten were found in the grave; and also a block of stone, so hollowed out and situated as evidently to have been intended for a support to the neck. The body had not been buried in a coffin, but,—as far as the very Rev. Dr. Spratt, (in whose possession these interesting relics at present are, and to whose kindness I am indebted for access to them,) could recollect,—in a grave lined with flags and covered with the same material.

In Dr. Wilde's Ethnology of the ancient Irish, republished in his "Beauties of the Boyne and Blackwater" (page 236) a side-view of this skull is given "as that of a Danish head of undoubted authenticity," though by some inexplicable oversight, he notices it for its "peculiar *length* in its antero-posterior diameter;" whereas one of its most striking peculiarities is its *immense lateral* or transversal diameter, as compared with its longitudinal.

By the aid of a moderate magnifying lens, portions of short *perfectly white* hair can be discerned adhering to the bone; and a microscopical examination of a fragment of the lining of the mitre, the mitre itself, having been made of a rich silk and gold tissue, furnishes the curious fact that *cotton* enters into its composition : a circumstance indicating the fabric to be, most probably, of Eastern manufacture; as cotton could scarcely have been introduced into Europe, in an unmanufactured condition at so early a period.

The second Table is from the skull of a human skeleton, discovered in November 1840, along with several weapons and ornaments, in the vicinity of Larne, County Antrim; an account of which, by Huband Smith, Esq., will be found in the Proceedings of the Royal Irish Academy, for 1840-1, part V., page 40.

At the time the Paper was read, the skeleton, weapons, ornaments, &c., were supposed to be of Irish origin and of very remote antiquity; a conclusion at variance with the subsequent observations of Worsaae, who, in his "Danes and Norwegians in Ireland," (page 311,) has the following remarks :—

" Lastly, Snorro Sturlesön relates that in, the beginning of the 11th century, a desperate naval battle was fought between the Orkney "jarl" Einar, and the Irish king Konofögr, in Ulfrek's, or Ulflek's Fiord, on the coast of Ireland. The situation of this *fiord* or firth was entirely unknown until it was lately discovered that, in a document issued by the English-Irish king, John, in the year 1210, the frith Lough Larne, on the east coast of Ireland, about fourteen miles north of Belfast, was at that time still called "Wulvricheford," which agrees most accurately with the Icelandic name "Ulfreksfjördr." By a remarkable coincidence, a skeleton was dug up a little while previously, just on the shores of Lough Larne, together with a pretty large iron sword, having a short guard and a large triangular pommel at the end of the hilt; the form of which sword, (as I shall prove,) was not Irish, but pure Scandinavian, like that of the swords used towards the close of heathenism in the north. There is every probability that the skeleton and sword belong to one of the Scandinavian warriors who fell in the above-mentioned battle, and was afterwards buried on the shore. Thus, both the exhumed antiquities, and the lost but re-discovered name of the place, contribute to corroborate the credibility of Snorro Sturlesön's account."

---

† " Danes and Norwegians in Ireland," pages 343-4.

The accuracy of this conclusion has been recognised, and the skull, ticketed "Danish Invader," is preserved in the Museum of Trinity College, Dublin; where, through the kindness of Dr. Ball, I was afforded every facility for examining and measuring it. Both the Crania selected, therefore, are supposed to be of the same race, and referable to a period not later than the 11th century.

In general appearance these two Crania afford some well marked contrasts, which the tables and diagrams will more precisely indicate. The skull of Donatus is broader, shorter, and less high, than that from Larne, and the whole contour more spherical. The sutures are much obliterated, the sagittal entirely. The teeth are all gone, the majority having evidently been lost during life time; circumstances further corroborative of the age of the individual. The nasal bones are much decayed; the cheek bones of moderate dimensions, rather receding, and projecting on either side considerably less than the temporal bones. The Foramen Magnum is an oval, 1.4 x 1.26 inches; its *transverse* diameter being the longest.

In the Larne skull the sutures are singularly distinct, even to the continuation of the sagittal through the frontal bone as far as the naso-frontal suture: the Wormian bones, also, are remarkably large. More than half the teeth have been dropped out of their sockets; only the six back-teeth of the left side remaining. These exhibit no traces of wearing, and the last molar, or wisdom-tooth, is considerably below the level of the others; all which circumstances justify us in concluding that the individual must have been young or in the prime of life. The nasal bones are perfect, projecting gracefully downwards with a slight downward curve at their extremities. The cheek-bones are massive and prominent, and project on either side to not much under the breadth of the temporal region. The Foramen Magnum is an oval, 1.6 x 1.3 inches; its *median axis* being the longest.

Measurements from the skull of Donatus or Dunan the first Danish Bishop of Dublin—died May 6, A.D. 1074.

TABLE 1.

Median Section.			
	Angular.		Rad.
L. Maxilla.	Angle of L. Maxilla. Symphisis Menti. Coronoid Process.	Absent.	
	Edge of Incisors.	—	—
Facial Bones.	Alveolar Process.	40	3.25
	Sub-Nasal Depression.	—	—
	Nasal Crest.	32	3.25
	Nasal Bones.	—	—
Naso-frontal S.		0	3.45
Frontal Bone.	Frontal Promin.	8	3.9
		10	3.9
		20	4.15
		30	4.35
		40	4.45
		50	4.45
		60	4.45
Coronal S.		64	4.45
Parietal Bone.		70	4.45
		80	4.45
		90	4.45
		100	4.4
		110	4.25
		120	4.15
Lambdoidal S.		125	4.15
Occipital Bone.		130	4.1
		140	3.9
		150	3.65
		160	3.25
	Occipital Spine.	164	—
		170	2.5
		180	1.75
Foramen M.		184	1.5
Lateral diameter of F. Mag.			1.4
Antero-posterior do.			1.26
Breadth of Zygomata,			5.1

Angular.		0	10	20	30	40	50	60	70	80	90
Transverse Sections at successive angular intervals of 10 degrees.—Left side.	10	3.9	4.0	3.9	3.75	2.85	2.7	2.65	2.5	2.5	External Auditory Foramen.
	20	4.15	4.15	4.1	3.9	3.45	3.0	2.85	2.65	2.5	
	30	4.35	4.4	4.3	4.05	3.7	3.2	3.05	2.8	2.5	
	40	4.45	4.45	4.35	4.15	3.8	3.4	3.2	2.8	2.5	
	50	4.45	4.5	4.35	4.2	3.95	3.55	3.3	2.95	2.6	
	60	4.45	4.5	4.4	4.25	4.05	3.7	3.4	3.0	2.6	
	70	4.45	4.5	4.45	4.3	4.15	3.8	3.45	3.05	2.65	
	80	4.45	4.45	4.45	4.4	4.25	3.8	3.5	3.1	2.7	
	90	4.45	4.45	4.45	4.4	4.25	3.95	3.55	3.15	2.7	
	100	4.4	4.45	4.5	4.4	4.2	3.85	3.5	3.1	2.75	
	110	4.25	4.35	4.35	4.3	4.05	3.75	3.4	3.1	2.8	
	120	4.15	4.25	4.25	4.15	3.9	3.65	3.3	2.95	2.8	
	130	4.1	4.2	4.1	3.95	3.7	3.5	3.2	2.75	2.7	
	140	3.9	4.0	3.95	3.75	3.5	3.3	3.0	2.8	2.6	
	150	3.65	3.7	3.6	3.55	3.2	3.0	2.9	2.8	2.6	
	160	3.25	3.3	3.2	3.1	3.0	2.8	2.8	2.7	2.5	
	170	2.5	2.5	2.7	2.7	2.75	2.65	2.55	2.65	2.5	
	180	1.75	1.75	2.1	2.2	2.35	2.4	2.45	2.55	2.45	

Angular.		0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	Extreme
Horizontal Sections at successive elevations of 0.5 Inches. Right side.	0	3.85	3.9	3.9	3.8	3.6	3.3	2.7	1.95		3.9
	10	3.9	3.95	3.95	3.85	3.65	3.3	2.8	2.0		3.95
	20	3.75	3.85	3.9	3.8	3.6	3.25	2.7	1.95		3.9
	30	3.65	3.75	3.7	3.6	3.45	3.15	2.6	1.85		3.75
	40	2.95	3.35	3.45	3.4	3.25	3.0	2.5	1.8		3.45
	50	2.7	2.95	3.15	3.2	3.1	2.9	2.45	1.8		3.2
	60	2.7	2.9	2.95	3.05	3.0	2.85	2.4	1.8		3.05
	70	2.65	2.85	3.0	2.95	2.9	2.8	2.4	1.8		3.0
	80	2.6	2.85	2.95	2.95	2.85	2.75	2.45	1.8		2.95
	90	2.6	2.8	2.9	2.95	2.85	2.7	2.4	1.8		2.95
	100	2.6	2.75	2.9	2.9	2.8	2.7	2.35	1.8		2.9
	110	2.7	2.75	2.9	2.9	2.8	2.65	2.3	1.75		2.9
	120	2.7	2.8	2.9	2.85	2.7	2.65	2.3	1.7		2.9
	130	2.65	2.8	2.9	2.9	2.75	2.6	2.25	1.65		2.9
	140	2.65	2.85	2.95	2.9	2.8	2.6	2.2	1.6		2.95
	150	2.6	2.85	3.0	3.0	2.9	2.65	2.2	1.6		3.0
	160	2.5	2.8	3.05	3.05	2.95	2.7	2.15	1.5		3.05
	170	2.4	2.8	3.0	3.1	2.95	2.7	2.15	1.45		3.1
	180	2.5	3.0	3.15	3.1	3.0	2.7	2.2	1.45		3.15

TABLE 2.

Measurements from a skull found at *Larne*, in the County of Antrim, at present in the Museum of Trinity College, Dublin, and ticketted "Danish Invader."

Median Section.			
	Angular.		Rad.
L. Maxilla.	Angle of L. Maxilla. Symphisis Menti. Coronoid Process.	Absent.	
	Edge of Incisors.	—	—
Facial Bones.	Alveolar Process.	41	4.0
	Sub-Nasal Depression.	35	3.75
	Nasal Crest.	31	3.85
	Nasal Bones.	12	4.15
Naso-frontal S.		0	3.7
Frontal Bone.	Frontal Promin.	6	4.0
		10	4.1
		20	4.4
		30	4.6
		40	4.65
		50	4.6
		60	4.6
Coronal S.		60	4.6
Parietal Bone.		70	4.6
		80	4.7
		90	4.7
		100	4.55
		110	4.4
		120	4.2
Lambdoidal S.		120	4.2
Occipital Bone.		130	4.1
		140	4.0
		150	3.7
		160	3.2
	Occipital Spine.	156	—
		170	2.4
		180	2.0
Foramen M.		185	1.8
Lateral diameter of F. Mag.			1.3
Antero-posterior do.			1.6
Breadth of Zygomata,			5.0

	Angular.	0	10	20	30	40	50	60	70	80	90
Transverse Sections at successive angular intervals of 10 degrees.—Left side.	10	4.1	4.1	3.95	3.85	2.7	2.65	2.45	2.3	2.3	External Auditory Foramen.
	20	4.4	4.4	4.3	4.0	3.3	2.9	2.6	2.4	2.35	
	30	4.6	4.55	4.45	4.15	3.5	3.1	2.7	2.65	2.4	
	40	4.65	4.55	4.5	4.2	3.7	3.2	2.8	2.5	2.45	
	50	4.6	4.5	4.4	4.2	3.8	3.3	2.8	2.5	2.45	
	60	4.6	4.5	4.4	4.2	3.8	3.2	2.9	2.6	2.4	
	70	4.6	4.5	4.4	4.25	3.95	3.4	2.95	2.6	2.45	
	80	4.7	4.55	4.45	4.3	4.0	3.45	3.0	2.65	2.4	
	90	4.7	4.6	4.5	4.4	4.0	3.45	3.0	2.65	2.45	
	100	4.55	4.5	4.45	4.3	3.95	3.4	3.0	2.7	2.5	
	110	4.4	4.4	4.3	4.25	3.8	3.35	2.9	2.7	2.35	
	120	4.2	4.2	4.15	3.95	3.6	3.2	2.9	2.7	2.35	
	130	4.1	4.15	4.1	3.8	3.5	3.15	2.85	2.65	2.4	
	140	4.0	4.0	3.85	3.6	3.25	3.0	2.8	2.6	2.4	
	150	3.7	3.7	3.55	3.3	3.1	2.8	2.7	2.6	2.4	
	160	3.2	3.05	3.05	3.0	2.9	2.65	2.6	2.6	2.4	
	170	2.4	2.6	2.65	2.65	2.6	2.5	2.5	2.6	2.4	
	180	2.0	2.0	2.15	2.2	2.35	2.3	2.35	2.6	2.35	

	Angular.	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	Extreme
Horizontal Sections at successive elevations of 0.5 Inches. Right side.	0	4.0	4.1	4.15	4.1	3.9	3.55	3.0	2.3	1.1	4.15
	10	4.0	4.1	4.15	4.1	3.85	3.5	2.95	2.2	1.05	4.15
	20	3.9	3.95	4.1	4.0	3.7	3.35	2.8	2.05	1.0	4.1
	30	3.75	3.85	3.9	3.8	3.6	3.2	2.7	1.95	0.9	3.9
	40	2.95	3.35	3.5	3.5	3.4	3.1	2.55	1.85	0.89	3.5
	50	2.75	2.95	3.1	3.2	3.15	2.95	2.45	1.8	0.8	3.2
	60	2.6	2.75	2.9	2.95	2.95	2.8	2.4	1.8	0.75	2.95
	70	2.5	2.65	2.75	2.8	2.8	2.7	2.45	1.85	0.7	2.8
	80	2.45	2.6	2.7	2.75	2.75	2.7	2.45	1.85	0.7	2.75
	90	2.5	2.65	2.7	2.75	2.75	2.7	2.45	1.85	0.7	2.75
	100	2.6	2.65	2.75	2.75	2.7	2.65	2.4	1.8	0.7	2.75
	110	2.65	2.75	2.8	2.75	2.7	2.6	2.35	1.8	0.65	2.8
	120	2.55	2.75	2.85	2.75	2.7	2.55	2.3	1.75	0.65	2.85
	130	2.6	2.75	2.75	2.85	2.75	2.55	2.25	1.7	0 .65	2.85
	140	2.65	2.8	2.9	2.95	2.85	2.6	2.2	1.65	0.65	2.95
	150	2.7	2.85	3.0	3.05	2.95	2.65	2.15	1.6	0.6	3.05
	160	2.7	2.85	3.1	3.1	3.0	2.75	2.15	1.55	0.6	3.1
	170	2.6	2.8	3.15	3.15	3.05	2.75	2.15	1.55	0.6	3.15
	180	2.4	2.9	3.2	3.25	3.1	2.75	2.25	1.65	0.7	3.25

EXPLANATION OF THE PLATES.

By the aid of the accompanying circle and scale, the one divided into degrees, and the other into inches and tenths, the 3 following diagrams have been projected from the preceding measurements.

No. 1:—the median section of each skull, traced upon the same plane, is sufficiently simple and intelligible. It affords, at a glance, ample means for comparing their relative forms and numerical proportions as viewed in profile.

The entire angular extent of each skull, from zero to the Foramen Magnum, is, for that of Donatus 184, and for that from Larne 185 degrees; of which, in Donatus, the frontal bone occupies 60, the parietal 61, and the occipital, 59 degrees; and in the Larne skull, the frontal 64, the parietal 60, and the occipital 65.

Comparing their peripheries they will be found to coincide only in the occipital region; first at 130 degrees, where each has a radius of 4.1 inches, again at 156° upon a radius of 2.25 inches, and lastly at 173° upon a radius of 2.25 inches: at every other point they differ considerably. At zero the difference amounts to 2.5 inches, which is reduced at 10 degrees, to 0.2,—at 20 and 30 degrees it again amounts to 0.25; but at 40° falls a second time to 0.2; from whence to 70° it sinks to 0.15;—at 80° and 90° it again reaches 0.25, thence gradually falling away to 130,° the first coincident point. They then separate, again to coincide at 156,° the difference, for so far, being altogether in favour of the Larne skull, and the preponderance chiefly in the frontal and coronal regions. From 156° to 173° the skull of Donatus projects slightly beyond that of Larne. The longest radius in the skull of Donatus is 4.45 inches, and in the Larne skull 4.7.

The difference in these various amounts, though apparently insignificant in figures, is sufficiently palpable when converted into outline;—the 0.05 of an inch constituting a marked distinction. The angular and radial measurements of the face contrast quite as remarkably, but, after the preceding observations, will sufficiently explain themselves.

The second diagram is projected from the *maximum* horizontal measurements of the right side, repeated also for the left, affording outlines such as we should have if we were to look down upon the skulls from a point perpendicularly above the *vertical* axis, and presuming both sides to be symmetrical. If a scale be extended from the centre of this diagram along any of its radii, that portion of the table of horizontal measurements corresponding to the angular position of the radius will indicate the extension of the Cranium along that line at every successive elevation of 0.5 inches.

The third diagram represents transverse sections of each skull, at 90 degrees from zero;—the right side projected from the horizontal, and the left from the transverse measurements. These are free from error and exhibit a *difference*, between the *right* and *left* sides of each skull, of 0.1 inches; the *left* exceeding the right in that of Donatus, and the *right* exceeding the left in that from Larne, by that amount, making a difference between the two skulls, at this particular section, of 0.2 inches more than the second diagram indicates; a defect I can devise no present method of correcting, unless it be to make similar measurements of both sides, and take the mean. Probably further experience may suggest some simpler remedy. In the meantime, the measurements recorded in the present instance furnish a perfectly faithful representation of each Cranium; insomuch that if we were to be at the trouble of cutting out the various sections in card, and adjusting them in their proper positions upon the median section, we should have almost every portion of the skull proper, or brain-box, accurately delineated.

A very cursory examination of the tables and the diagrams will now be sufficient to exhibit how remarkably these two Crania differ in form and size, as well as in what particulars. Thus the skull of Donatus considerably exceeds the one from Larne in breadth, and falls short of it in length. It is less elevated throughout, and particularly so from zero to 40 degrees in the frontal region, and from 70° to 100° in the parietal. Viewed vertically, it gradually extends beyond it from 50° to 140°, attaining its maximum preponderance between 80° and 100°;—seen from behind, it exceeds it in breadth through a range of 60 degrees from 30° to 90°, attaining its greatest magnitude at 55,° and exhibiting throughout a remarkably circular outline. On the other hand the Larne skull is broadest at about 43 degrees, and gradually narrows downwards, in a nearly straight line, to 90°; its sides somewhat overhanging the perpendicular.

The unusual lateral diameter of the Foramen Magnum exceeding, as it does, its longitudinal, by 0.16 inches, may possibly indicate, in the skull of Donatus, some abnormal lateral development, referable rather to individual than to typical deviation; but, making every allowance for such possible aberration, the differences enumerated, and which have their special signification for the phrenologist, are amply sufficient to stamp the two Crania as belonging to widely different types.

If the one be authentically Danish, as we have every reason to believe, what then is the other? It certainly is not Irish, as we expect before long to be in a position to prove. The weapons and ornaments found with it, would, upon the high authority of Worsaae, indicate it to be of Northern origin. If so, there must have existed the most marked typical differences in the cerebral organization of those who were, at the very remote period to which these Crania belong, classed under the common denomination of Northmen. *This much* these two Crania incontestibly prove; but beyond this, we must wait the accumulation of further materials before we can hazard even a conjecture.

In conclusion, the chief value of the method now suggested appears to me to be its strictly *numerical* foundation, and consequent unquestionable accuracy. The facility with which measurements can be taken, recorded, and compared, and the perfect outline of any section produced, in the absence of plates; besides the advantage, specially its own, which it affords, for combining any required number of observations, and deducing therefrom averages which shall represent the normal type more faithfully than any single specimen. As yet the leisure at my command has not permitted me to work out the question so fully as I contemplate doing; but already, I think, I can perceive the practicability of constructing, from these tables, a simple method of approximatively ascertaining the *cubical dimensions* of a Cranium. As already observed, what has now been offered is merely as a first experiment, my principal object in making the present communication public being to take the opinion, and solicit the advice, of those who feel an interest in such investigations.